What is claimed is:

1. An inhibitor of histone deacetylase represented by formula (1):

$$\mathbf{Cy–X–Y^1–W} \qquad (1)$$

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted;

X is selected from the group consisting of C=O, $C=CH_2$, CH(OH), $CH(OR^1)$, C=N(OH), and $C=N(OR^1)$, where R^1 is alkyl, aryl, aralkyl, or acyl;

Y^1 is a C_3-C_7 alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the linear chain connecting X and W may be replaced with O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that the atoms in Y^1 that are attached to X and to W are carbon atoms, and further provided that Y^1 does not comprise an ester or amide linkage in the linear chain connecting X and W; and

W is selected from the group consisting of $-C(O)-CH_2-SR^2$, -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation;

Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy;

provided that X is $C{=}CH_2$, $CH(OR^1)$, $C{=}N(OH)$, or $C{=}N(OR^1)$ when W is -C(O)-NH-OM and Cy is unsubstituted phenyl, dimethylaminophenyl, or methoxyphenyl; and

further provided that when W is $-C(O)-CH_2-SR^2$, the carbon atom in Y^1 that is attached to W is unsubstituted or is substituted with other than amino, acylamino, alkoxycarbonyl, or carbamoyl.

2. The inhibitor of claim 1, wherein Cy is C_6-C_{10} aryl or is a radical of a heterocyclic moiety selected from the group consisting of thiophene, benzothiophene, furan, benzofuran, pyridine, quinoline, indole, isoquinoline, thiazole, morpholine, piperidine, and piperazine, any of which groups may be optionally substituted.

3. The inhibitor of claim 2, wherein the aryl or heterocyclic moiety is substituted by one or two substituents independently selected from the group consisting of C_1-C_4 alkyl, C_1-C_4 haloalkyl, C_6-C_{10} aryl, heteroaryl, heterocyclyl, (C_6-C_{10})ar(C_1-C_6)alkyl, halo, nitro, hydroxy, C_1-C_6 alkoxy, C_6-C_{10} aryloxy, heteroaryloxy, C_1-C_6 alkoxycarbonyl, C_6-C_{10} aryloxycarbonyl, heteroaryloxycarbonyl, carboxy, and amino.

4. The inhibitor of claim 1, wherein Cy has the formula $-Cy^1-Cy^2$ or $-Cy^1-G-Cy^2$, wherein Cy^1 and Cy^2 are independently C_3-C_6 cycloalkyl, C_6-C_{10} aryl, or a radical of a heterocyclic moiety, which groups optionally may be substituted, and G is O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2.

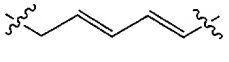
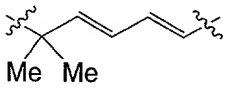
5. The inhibitor of claim 4, wherein Cy^1 and Cy^2 are independently selected from the group consisting of phenyl, pyridinyl, morpholinyl, piperidinyl, piperazinyl, which groups optionally may be substituted.

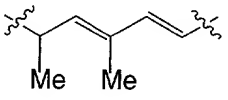
6. The inhibitor of claim 1, wherein X is selected from the group consisting of $CH(OR^1)$, C=N(OH), and $C=N(OR^1)$, where R^1 is C_1-C_6 alkyl, C_6-C_{10} aryl, or (C_6-C_{10})ar(C_1-C_6)alkyl.

7. The inhibitor of claim 1, wherein one to about three carbon atoms of the alkylene are independently substituted with halo, oxo, oximino, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, alkoxycarbonyl, carboxy, hydroxyalkyl, acyl, acyloxy, or cyano.

8. The inhibitor of claim 1, wherein Y^1 comprises an all-carbon linear chain connecting X and W.

9. The inhibitor of claim 8, wherein the linear chain connecting X and W comprises a dienyl moiety, wherein the dienyl moiety is attached to W.

10. The inhibitor of claim 9, wherein Y^1 is selected from the group consisting of  , 

, and 

11. The inhibitor of claim 8, wherein Y^1 is $-(CH_2)_m$, where m is 5, 6, or 7.

12. The inhibitor of claim 1, wherein one carbon atom in the linear chain connecting X and W is replaced with O, NR^3, or $S(O)_n$.

13. The inhibitor of claim 12, wherein Y^1 is $-(CH_2)$-$S(O)_n$-$(CH_2)_p$, where n is 0, 1, or 2, and p is 3, 4, or 5.

14. The inhibitor of claim 1, wherein W is -C(O)-NH-OM, M being selected from the group consisting of hydrogen, sodium, potassium, magnesium, and calcium.

15. The inhibitor of claim 1, wherein W is -C(O)-NH-Z or -NH-C(O)-NH-Z, Z being unsubstituted 2-anilinyl or unsubstituted 2-pyridyl.

16. The inhibitor of claim 1, wherein W is $-C(O)-CH_2-SR^2$, R^2 being selected from the group consisting of C_1-C_6 alkyl, C_6-C_{10} aryl, (C_6-C_{10})ar(C_1-C_6)alkyl, (C_1-C_6 alkyl)carbonyl, (C_6-C_{10} aryl)carbonyl, and ((C_6-C_{10})ar(C_1-C_6)alkyl)carbonyl, wherein the aryl portion of any such groups may be optionally substituted.

17. The inhibitor of claim 16, wherein R^2 is selected from the group consisting of methyl, phenyl, benzyl, benzoyl, and acetyl.

18. An inhibitor of histone deacetylase represented by formula (2):

$$\mathbf{Cy–Y^2–W} \qquad (2)$$

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted;

Y^2 is C_5-C_7 alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the linear chain connecting Cy and W may be replaced with O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that Y^2 does not comprise an ester or amide linkage in the linear chain connecting Cy and W; and

W is selected from the group consisting of $-C(O)-CH_2-SR^2$, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted; and

Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which

groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy;

provided that when W is -C(O)-CH_2-SR^2, the carbon atom in Y^2 that is attached to W is unsubstituted or is substituted with other than amino, acylamino, alkoxycarbonyl, or carbamoyl.

19. The inhibitor of claim 18, wherein Cy is C_6-C_{10} aryl or is a radical of a heterocyclic moiety selected from the group consisting of thiophene, benzothiophene, furan, benzofuran, pyridine, quinoline, indole, isoquinoline, thiazole, morpholine, piperidine, piperazine, quinazolinone, benzotriazinone, phthalimide, and dioxobenzoisoquinoline, any of which groups may be optionally substituted.

20. The inhibitor of claim 18, wherein the aryl or heterocyclic moiety is substituted by one or two substituents independently selected from the group consisting of C_1-C_4 alkyl, C_1-C_4 haloalkyl, C_6-C_{10} aryl, heteroaryl, heterocyclyl, (C_6-C_{10})ar(C_1-C_6)alkyl, halo, nitro, hydroxy, C_1-C_6 alkoxy, C_6-C_{10} aryloxy, heteroaryloxy, C_1-C_6 alkoxycarbonyl, C_6-C_{10} aryloxycarbonyl, heteroaryloxycarbonyl, carboxy, and amino.

21. The inhibitor of claim 20, wherein Cy has the formula -Cy^1-Cy^2 or -Cy^1-G-Cy^2, wherein Cy^1 and Cy^2 are independently C_3-C_6 cycloalkyl, C_6-C_{10} aryl, or a radical of a heterocyclic moiety, which groups optionally may be substituted, and G is O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2.

22. The inhibitor of claim 21, wherein Cy^1 and Cy^2 are independently selected from the group consisting of phenyl, pyridinyl, morpholinyl, piperidinyl, piperazinyl, which groups optionally may be substituted.

23. The inhibitor of claim 18, wherein one to about four carbon atoms of the alkylene are independently substituted with halo, oxo, oximino, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, alkoxycarbonyl, carboxy, hydroxyalkyl, acyl, acyloxy, or cyano.

24. The inhibitor of claim 18, wherein one carbon atom in the linear chain connecting Cy and W is replaced with O, NR^3, or $S(O)_n$.

25. The inhibitor of claim 19, wherein one carbon atom in the linear chain connecting Cy and W is replaced with NR^3, where R^3 is selected from the group consisting of C_1-C_6 alkyl, C_6-C_{10} aryl, (C_6-C_{10})ar(C_1-C_6)alkyl, (C_1-C_6 alkyl)oxycarbonyl, (C_6-C_{10} aryl)oxycarbonyl, ((C_6-C_{10})ar(C_1-C_6)alkyl)oxycarbonyl, (C_1-C_6 alkyl)carbonyl, (C_6-C_{10} aryl)carbonyl, and ((C_6-C_{10})ar(C_1-C_6)alkyl)carbonyl.

26. The inhibitor of claim 18, wherein one or two carbon atoms in the linear chain connecting Cy and W are replaced by O.

27. The inhibitor of claim 18, wherein W is -C(O)-NH-Z or -NH-C(O)-NH-Z, Z being unsubstituted 2-anilinyl or unsubstituted 2-pyridyl.

28. The inhibitor of claim 18, wherein W is -C(O)-CH_2-SR^2, R^2 being selected from the group consisting of C_1-C_6 alkyl, C_6-C_{10} aryl, (C_6-C_{10})ar(C_1-C_6)alkyl, (C_1-C_6 alkyl)carbonyl, (C_6-C_{10} aryl)carbonyl, and ((C_6-C_{10})ar(C_1-C_6)alkyl)carbonyl, wherein the aryl portion of any such groups may be optionally substituted.

29. The inhibitor of claim 28, wherein R^2 is selected from the group consisting of methyl, phenyl, benzyl, benzoyl, and acetyl.

30. An inhibitor of histone deacetylase represented by formula (3):

$$\mathbf{Cy–S(O)_2–NH–Y^3–W} \qquad (3)$$

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted, provided that Cy is other than dimethylaminonaphthyl when Y^3 is $-(CH_2)_3-$;

Y^3 is C_2-C_6 alkylene, wherein said alkylene may be optionally substituted with one or more substituents independently selected from the group consisting of halo, hydroxy, oxo, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, carboxy, hydroxyalkyl, acyl, acyloxy, and cyano; and

W is selected from the group consisting of $-C(O)-CH_2-SR^2$, -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation; and

Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy;

provided that Z does not have the formula $-(C_5H_3N)-NHC(O)-Y^3-NH-S(O)_2$-Cy.

31. The inhibitor of claim 30, wherein Cy is C_6-C_{10} aryl or is a radical of a heterocyclic moiety selected from the group consisting of thiophene, benzothiophene, furan, benzofuran, pyridine, quinoline, indole, isoquinoline, thiazole, morpholine, piperidine, and piperazine, any of which groups may be optionally substituted.

32. The inhibitor of claim 31, wherein the aryl or heterocyclic moiety is substituted by one or two substituents independently selected from the group

consisting of C_1-C_4 alkyl, C_1-C_4 haloalkyl, C_6-C_{10} aryl, heteroaryl, heterocyclyl, (C_6-C_{10})ar(C_1-C_6)alkyl, halo, nitro, hydroxy, C_1-C_6 alkoxy, C_6-C_{10} aryloxy, heteroaryloxy, C_1-C_6 alkoxycarbonyl, C_6-C_{10} aryloxycarbonyl, heteroaryloxycarbonyl, carboxy, and amino.

33. The inhibitor of claim 30, wherein Cy has the formula -Cy^1-Cy^2 or -Cy^1-G-Cy^2, wherein Cy^1 and Cy^2 are independently C_3-C_6 cycloalkyl, C_6-C_{10} aryl, or a radical of a heterocyclic moiety, which groups optionally may be substituted, and G is O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2.

34. The inhibitor of claim 33, wherein Cy^1 and Cy^2 are independently selected from the group consisting of phenyl, pyridinyl, morpholinyl, piperidinyl, piperazinyl, which groups optionally may be substituted.

35. The inhibitor of claim 30, wherein Y^3 is a C_2-C_6 alkylene optionally substituted with one or two non-hydrogen substituents independently selected from the group consisting of halo, hydroxy, oxo, nitro, (halo)$_{1\text{-}5}$(C_1-C_3)alkyl, C_1-C_6 alkyl, (C_6-C_{10})ar(C_1-C_6)alkyl, C_1-C_6 alkoxy, C_6-C_{10} aryloxy, carboxy, hydroxy(C_1-C_6)alkyl, C_1-C_6 alkylcarbonyl, C_6-C_{10} arylcarbonyl, C_1-C_6 alkylcarbonyloxy, C_6-C_{10} arylcarbonyloxy, and cyano.

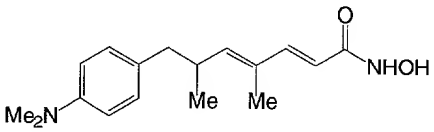
36. The inhibitor of claim 33, wherein Y^3 is an optionally substituted saturated C_4-C_5 alkylene.

37. The inhibitor of claim 30, wherein W is -C(O)-NH-OM, M being selected from the group consisting of hydrogen, sodium, potassium, magnesium, and calcium.

38. The inhibitor of claim 30, wherein W is -C(O)-NH-Z or -NH-C(O)-NH-Z, Z being unsubstituted 2-anilinyl or unsubstituted 2-pyridyl.

39. The inhibitor of claim 30, wherein W is $-C(O)-CH_2-SR^2$, R^2 being selected from the group consisting of C_1-C_6 alkyl, C_6-C_{10} aryl, (C_6-C_{10})ar(C_1-C_6)alkyl, (C_1-C_6 alkyl)carbonyl, (C_6-C_{10} aryl)carbonyl, and ((C_6-C_{10})ar(C_1-C_6)alkyl)carbonyl, wherein the aryl portion of any such groups may be optionally substituted.

40. An inhibitor of histone deacetylase represented by one of formulae (4)-(5):



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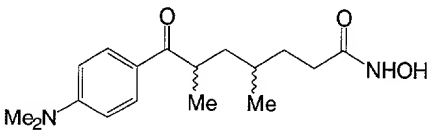
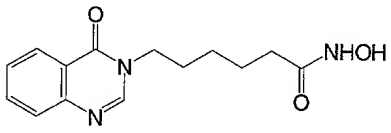


(5)

41. An inhibitor of histone deacetylase represented by one of formulae (6)-(7):



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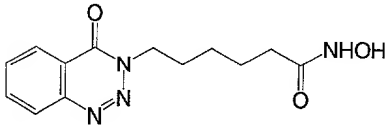


(7)

42. A pharmaceutical composition comprising an inhibitor of histone deacetylase represented by formula (1):

Cy–X–Y^1–W (1)

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted;

X is selected from the group consisting of C=O, $C=CH_2$, CH(OH), $CH(OR^1)$, C=N(OH), and $C=N(OR^1)$, where R^1 is alkyl, aryl, aralkyl, or acyl;

Y^1 is a C_3-C_7 alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the linear chain connecting X and W may be replaced with O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that the atoms in Y^1 that are attached to X and to W are carbon atoms, and further provided that Y^1 does not comprise an ester or amide linkage in the linear chain connecting X and W; and

W is selected from the group consisting of $-C(O)-CH_2-SR^2$, -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation;

Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy; and

a pharmaceutically acceptable carrier, excipient, or diluent;

provided that X is $C=CH_2$, $CH(OR^1)$, C=N(OH), or $C=N(OR^1)$ when W is -C(O)-NH-OM and Cy is unsubstituted phenyl, dimethylaminophenyl, or methoxyphenyl; and

further provided that when W is -C(O)-CH_2-SR^2, the carbon atom in Y^1 that is attached to W is unsubstituted or is substituted with other than amino, acylamino, alkoxycarbonyl, or carbamoyl.

43. A pharmaceutical composition comprising an inhibitor of histone deacetylase represented by formula (2):

Cy–Y^2–W (2)

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted;

Y^2 is C_5-C_7 alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the linear chain connecting Cy and W may be replaced with O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that Y^2 does not comprise an ester or amide linkage in the linear chain connecting Cy and W; and

W is selected from the group consisting of -C(O)-CH_2-SR^2, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted; and

Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy; and

a pharmaceutically acceptable carrier, excipient, or diluent;

provided that when W is -C(O)-CH_2-SR^2, the carbon atom in Y^2 that is attached to W is unsubstituted or is substituted with other than amino, acylamino, alkoxycarbonyl, or carbamoyl.

44. A pharmaceutical composition comprising an inhibitor of histone deacetylase represented by formula (3):

$$\mathbf{Cy–S(O)_2–NH–Y^3–W} \qquad (3)$$

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted, provided that Cy is other than dimethylaminonaphthyl when Y^3 is -$(CH_2)_3$–;

Y^3 is C_2-C_6 alkylene, wherein said alkylene may be optionally substituted with one or more substituents independently selected from the group consisting of halo, hydroxy, oxo, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, carboxy, hydroxyalkyl, acyl, acyloxy, and cyano; and

W is selected from the group consisting of -C(O)-CH_2-SR^2, -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

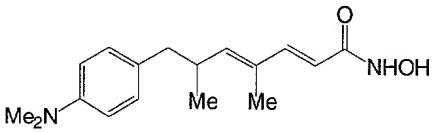
M is hydrogen or a pharmaceutically acceptable cation; and

Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy; and

a pharmaceutically acceptable carrier, excipient, or diluent.

provided that Z does not have the formula –(C_5H_3N)–NHC(O)–Y^3–NH-$S(O)_2$-Cy.

45. A pharmaceutical composition comprising an inhibitor of histone deacetylase represented by one of formulae (4)-(5):



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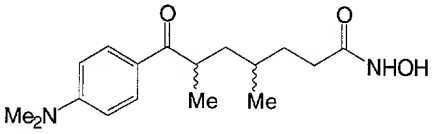
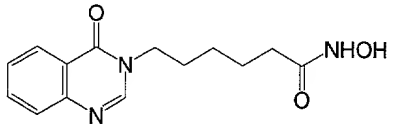


(5);

and a pharmaceutically acceptable carrier, excipient, or diluent.

46. A pharmaceutical composition comprising an inhibitor of histone deacetylase represented by one of formulae (6)-(7):



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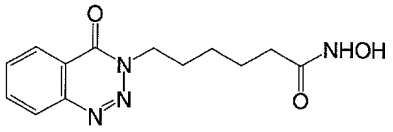


(7);

and a pharmaceutically acceptable carrier, excipient, or diluent.

47. A method of inhibiting histone deacetylase in a cell, comprising contacting a cell in which inhibition of histone deacetylase is desired with an inhibitor of histone deacetylase represented by formula (1):

$$\mathbf{Cy–X–Y^1–W} \qquad (1)$$

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted;

X is selected from the group consisting of C=O, $C=CH_2$, CH(OH), $CH(OR^1)$, C=N(OH), and $C=N(OR^1)$, where R^1 is alkyl, aryl, aralkyl, or acyl;

Y^1 is a C_3-C_7 alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the linear chain connecting X and W may be replaced with O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that the atoms in Y^1 that are attached to X and to W are carbon atoms, and further provided that Y^1 does not comprise an ester or amide linkage in the linear chain connecting X and W; and

W is selected from the group consisting of $-C(O)-CH_2-SR^2$, -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation;

Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy;

provided that X is $C=CH_2$, $CH(OR^1)$, C=N(OH), or $C=N(OR^1)$ when W is -C(O)-NH-OM and Cy is unsubstituted phenyl, dimethylaminophenyl, or methoxyphenyl; and

further provided that when W is $-C(O)-CH_2-SR^2$, the carbon atom in Y^1 that is attached to W is unsubstituted or is substituted with other than amino, acylamino, alkoxycarbonyl, or carbamoyl.

48. A method of inhibiting histone deacetylase in a cell, comprising contacting a cell in which inhibition of histone deacetylase is desired with an inhibitor of histone deacetylase represented by formula (2):

$$Cy–Y^2–W \qquad (2)$$

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted;

Y^2 is C_5-C_7 alkylene, wherein said alkylene may be optionally substituted, and wherein one or two carbon atoms in the linear chain connecting Cy and W may be replaced with O, NR^3, or $S(O)_n$, where R^3 is hydrogen, alkyl, aryl, aralkyl, sulfonyl, acyl, alkoxycarbonyl, or carbamoyl, and n is 0, 1, or 2, provided that Y^2 does not comprise an ester or amide linkage in the linear chain connecting Cy and W; and

W is selected from the group consisting of -C(O)-CH_2-SR^2, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted; and

Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy;

provided that when W is -C(O)-CH_2-SR^2, the carbon atom in Y^2 that is attached to W is unsubstituted or is substituted with other than amino, acylamino, alkoxycarbonyl, or carbamoyl.

49. A method of inhibiting histone deacetylase in a cell, comprising contacting a cell in which inhibition of histone deacetylase is desired with an inhibitor of histone deacetylase represented by formula (3):

$$Cy–S(O)_2–NH–Y^3–W \qquad (3)$$

wherein

Cy is cycloalkyl, aryl, or a radical of a heterocyclic moiety, any of which may be optionally substituted, provided that Cy is other than dimethylaminonaphthyl when Y^3 is $-(CH_2)_3-$;

Y^3 is C_2-C_6 alkylene, wherein said alkylene may be optionally substituted with one or more substituents independently selected from the group consisting of halo, hydroxy, oxo, nitro, haloalkyl, alkyl, aralkyl, alkoxy, aryloxy, carboxy, hydroxyalkyl, acyl, acyloxy, and cyano; and

W is selected from the group consisting of $-C(O)-CH_2-SR^2$, -C(O)-NH-OM, -NH-C(O)-NH-Z, and -C(O)-NH-Z, where

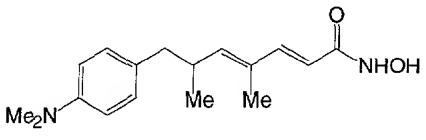
R^2 is alkyl, aryl, aralkyl, or acyl, wherein the aryl portion of any such groups may be optionally substituted;

M is hydrogen or a pharmaceutically acceptable cation; and

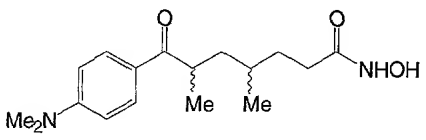
Z is selected from the group consisting of anilinyl, pyridyl, thiazolyl, hydroxyphenyl, thiadiazolyl, anilinylmethyl, or pyridylmethyl, any of which groups optionally may be substituted with halo, hydroxy, amino, nitro, C_1-C_4 alkyl, or C_1-C_4 alkoxy;

provided that Z does not have the formula $-(C_5H_3N)-NHC(O)-Y^3-NH-S(O)_2$-Cy.

50. A method of inhibiting histone deacetylase in a cell, comprising contacting a cell in which inhibition of histone deacetylase is desired with an inhibitor of histone deacetylase represented by one of formulae (4)-(5):

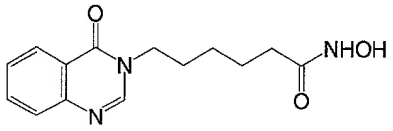


(4)

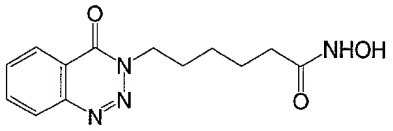


(5)

51. A method of inhibiting histone deacetylase in a cell, comprising contacting a cell in which inhibition of histone deacetylase is desired with an inhibitor of histone deacetylase represented by one of formulae (6)-(7):



(6)



(7)

52. The method of any one of claims 47-51, wherein cell proliferation is inhibited in the contacted cell.

53. The method of any one of claims 47-51, wherein the cell is a neoplastic cell.

54. The method of claim 53, wherein the neoplastic cell is in an animal.

55. The method of claim 54, wherein the neoplastic cell is in a neoplastic growth.

56. The method of any one of claims 47-51, further comprising contacting the cell with an antisense oligonucleotide that inhibits the expression of a histone deacetylase.